MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
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RM Number: 8850
MSDS Number: 8850
RM Name: Zeolite Y

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Description: This Reference Material (RM) is intended to provide a common source of zeolite Y for measurement comparisons. Each unit of zeolite Y consists of approximately 35 g to 40 g of material in a sealed container.

Substance: Zeolite Y

Other Designations: Zeolite type Y; FAU; Linde type Y; faujasite; zeolite.

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component:	Zeolite Y (this product is a complex mixture under TSCA)
CAS Number:	1344-00-9
EC Number (EINECS):	215-684-8
EC Classification:	XN (harmful); not classified in Annex I of Directive 67/548/EEC
EC Risk:	R36 (irritating to eyes) R37 (irritating to respiratory system)
EC Safety:	S22 (do not breathe dust) S25 (avoid contact with eyes)

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 1 Fire = 0 Reactivity = 1

Major Health Hazards: Since Zeolite Y particles are small enough to enter the lungs, short-term inhalation could overload lung clearance mechanisms, causing temporary irritation. Zeolites also contain small amounts of fine silica dust, which can cause lung damage or cancer after long-term exposure (unlikely in normal use).

Physical Hazards: None

Potential Health Effects

Inhalation: Dust may irritate or damage respiratory tract; unlikely at normal exposure levels.

Skin Contact: Prolonged or repeated contact may dry skin and cause temporary irritation.

Eye Contact: Dust may cause mechanical irritation or abrasion.

Ingestion: Unlikely; no known harmful effects at normal exposure levels.

Medical Conditions Aggravated by Exposure: Long-term inhalation exposure may aggravate asthma, bronchitis, emphysema, or other chronic conditions. Smoking increases the effects of exposure.

Listed as a Carcinogen/ Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

At least one naturally occurring zeolite (erionite) is a known carcinogen. The IARC has concluded that there is inadequate evidence for the carcinogenicity of other zeolites, and has listed them as Class 3 (unclassifiable). This material may, however, contain fine particles of silica dust, which IARC lists as a probable human carcinogen.

4. First Aid Measures

Inhalation: Move to fresh air. Seek medical aid immediately if irritation persists or if breathing is difficult.

Skin Contact: Wash affected skin with running water and non-abrasive soap. Seek medical aid if irritation persists. Wash contaminated clothing before re-use.

Eye Contact: Remove contact lenses (if any). Flush eyes with running water for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. Seek medical aid if irritation persists.

Ingestion: In the unlikely event that someone swallows a large amount of this material, contact a poison control center immediately. Do not induce vomiting unless instructed to do so.

5. Fire Fighting Measures

Fire and Explosion Hazards: Zeolite itself does not burn, but in a fire, any absorbed materials may burn.

Extinguishing Media: Water spray will reduce irritant gases that may be released by other materials involved in the surrounding fire. Regular dry chemical, foam, or CO_2 may also be used.

Fire Fighting: Avoid inhalation of dust or combustion products released by other burning materials. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): N/A (noncombustible).

Autoignition (°C): N/A

Flammability Limits in Air: N/A

Lower Explosive Limit (LEL): N/A

Upper Explosive Limit (UEL): N/A

Flammability Class (OSHA): N/A

Products of Combustion: None.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Isolate the spill area. Use personal protection (see Section 8). Ventilate and avoid raising dust. Sweep, scoop, or vacuum material and flush residue with water.

Disposal: Refer to Section 13, "Disposal Considerations."

7. HANDLING AND STORAGE

Storage: Keep in sealed container in a dry, well-ventilated area.

Safe Handling Precautions: Wear eye protection and gloves if needed (see Section 8), and avoid contact or inhalation.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

OSHA Permissible Exposure Limit (PEL): 15 mg/m^3 total dust, 5 mg/m^3 respirable
ACGIH Threshold Limit Value (TLV): 10 mg/m^3 total dust, 3 mg/m^3 respirable
OSHA TWA for SiO_2 respirable dust (if present): 0.05 mg/m^3

Ventilation: A good general ventilation system should be sufficient to control airborne levels. If user operations generate dust, use ventilation to minimize exposure.

Respirator: If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of dust respirators certified by NIOSH.

Eye Protection: Chemical goggles or face shield. The employer should provide an emergency eye wash fountain and safety shower in the work area.

Personal Protection: If contact is unavoidable, wear impervious disposable gloves and appropriate protective clothing. Wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: Zeolite Y

Appearance and Odor: White powder, odorless

Relative Molecular Weight: N/A

Compositional Formula: $Na_{54.0}Al_{54.1}Si_{137.9}O_{384}{\cdot}245.1H_2O$

Density (g/cm^3): >1

Water Solubility (g/L): Negligible

Boiling Point (°C): N/A

Melting Point (°C): Decomposes before melting.

Vapor Pressure (at 96°C, Pa): Negligible

Vapor Density (Air = 1): N/A

Critical Solution Temperature: N/A

pH: Aqueous suspensions are alkaline (pH = 9–10).

10. STABILITY AND REACTIVITY

Stability: __X__ Stable _____Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Containers should be kept dry.

Incompatible Materials: Strong acids, strong oxidizing agents.

Fire/Explosion Information: N/A

Hazardous Decomposition: N/A

Hazardous Polymerization: _____ Will Occur __X__ Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: __X__ Inhalation __X__ Skin __X__ Ingestion

Toxicity Data:

Rat, LD_{50} (oral, for related zeolites): >10 g/kg

Rat, LC_{50} (inhalation, 1 hr, for related zeolites): >5.3 g/m^3

A related zeolite, when fed to rats for 168 or 200 days at 0.125% or 2% of diet, adversely affected the urinary bladder and kidneys. Other silicates ingested at high levels caused similar effects.

A related zeolite, when fed to rats for 104 weeks at dosages up to 0.1% of diet, adversely affected the kidneys but did not cause cancer.

Rats exposed to a related zeolite by inhalation for 22 months showed no carcinogenic or fibrogenic effects.

A comparative study of the biological response and chemical reactivity of several zeolites concluded that the toxicity of Zeolite Y should be relatively low.

Target Organ(s): Lungs (fine particulates); eyes (mechanical irritation); kidney and urinary bladder, after long-term ingestion in large amounts.

Mutagen/Teratogen: One natural zeolite has induced aberrant metaphases in human and mouse cell cultures. Others have yielded negative results. At present, zeolite Y is not a suspected mutagen or teratogen.

Health Effects: See Section 3.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data (related zeolites):

Bluegill (*Lepomis macrochirus*), 96-hr lethality testing: No effects at concentrations up to 680 mg/L

Catfish (*Ictalurus punctatus*), 96-hr lethality testing: No effects at concentrations up to 680 mg/L

Fathead minnow (*Pimephales promelas*), 96-hr lethality testing: No effects at concentrations up to 680 mg/L

Oyster (*Crassostrea virginica*), 96-hr lethality testing: No effects at concentrations up to 780 mg/L

Shrimp (*Penaeus duorarum*), 96-hr lethality testing: No effects at concentrations up to 780 mg/L

Pinfish (*Lagodon rhomboides*), 96-hr lethality testing: No effects at concentrations up to 780 mg/L

Environmental Summary: Zeolites are not known to biodegrade or bioaccumulate. Ecotoxicity is low.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of according to local, state, and federal regulations. Zeolite Y is not a RCRA hazardous waste, but use of this material may change some of its properties. Zeolite can absorb other materials.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302: Not regulated.

SARA Title III Section 304: Not regulated.

SARA Title III Section 313: Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes
CHRONIC:	No
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Zeolite itself is not listed. Silica, airborne particles of respirable size: listed.

CANADIAN REGULATIONS

WHMIS Classification: Not a controlled product; D2B, other toxic effects (respiratory & eye irritation)

WHMIS Ingredient Disclosure List: N/A

CEPA Domestic Substances List (DSL): All components are listed.

EUROPEAN REGULATIONS

EU/EC Classification: XN (harmful); not classified in Annex I of Directive 67/548/EE**C**

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): All components are listed on inventory.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources:

European Chemicals Bureau, IUCLID Dataset: Zeolites, 18 February 2000.

Fach E., et al., Analysis of the biological and chemical reactivity of zeolite-based aluminosilicate fibers and particulates. *Environmental Health Perspectives* 110(11):1087-1096, Nov 2002.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 68: Silica.

Maki AW, Macek KJ, Aquatic environmental safety assessment for a nonphosphate detergent builder. *Environmental Science and Technology* 12(5):573-80, 1978.

U.S. National Institute for Occupational Safety and Health, *NIOSH Pocket Guide to Chemical Hazards*, June 1990 edition. DHHS (NIOSH) Publication No. 90-117.